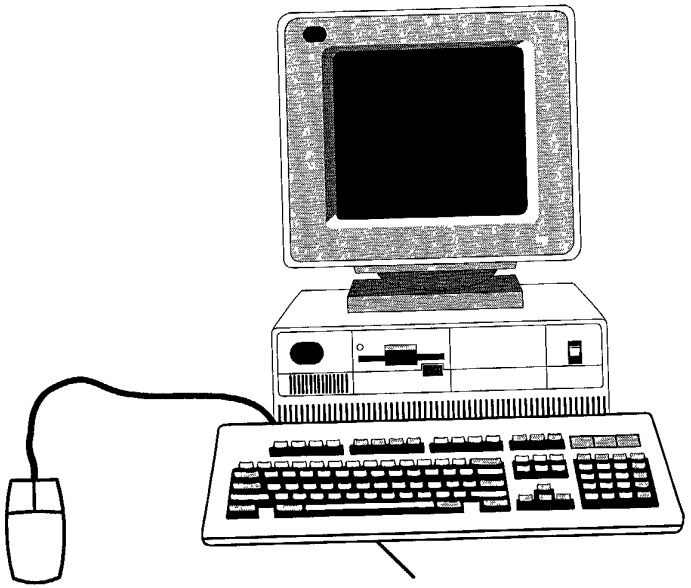


Host Computer System
102

Figure 1

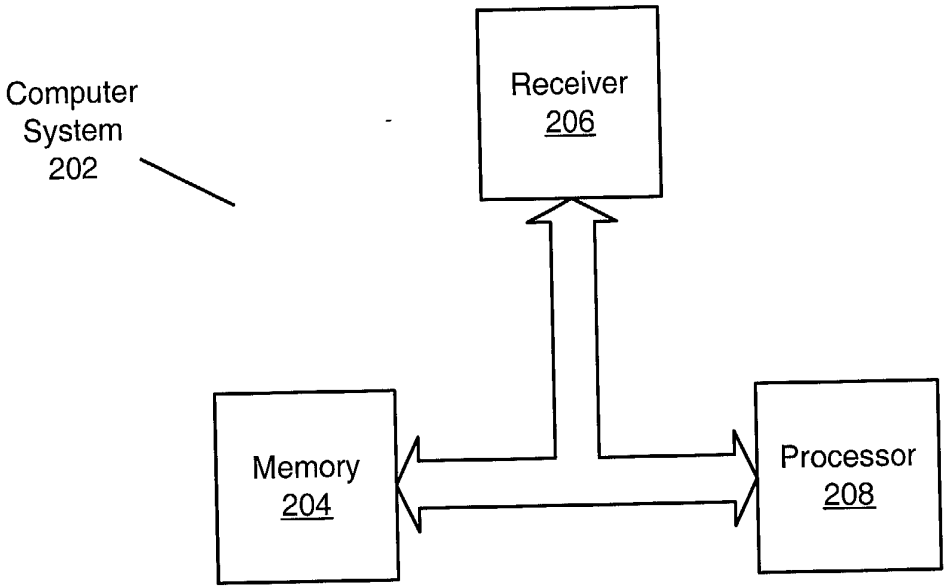


Figure 2

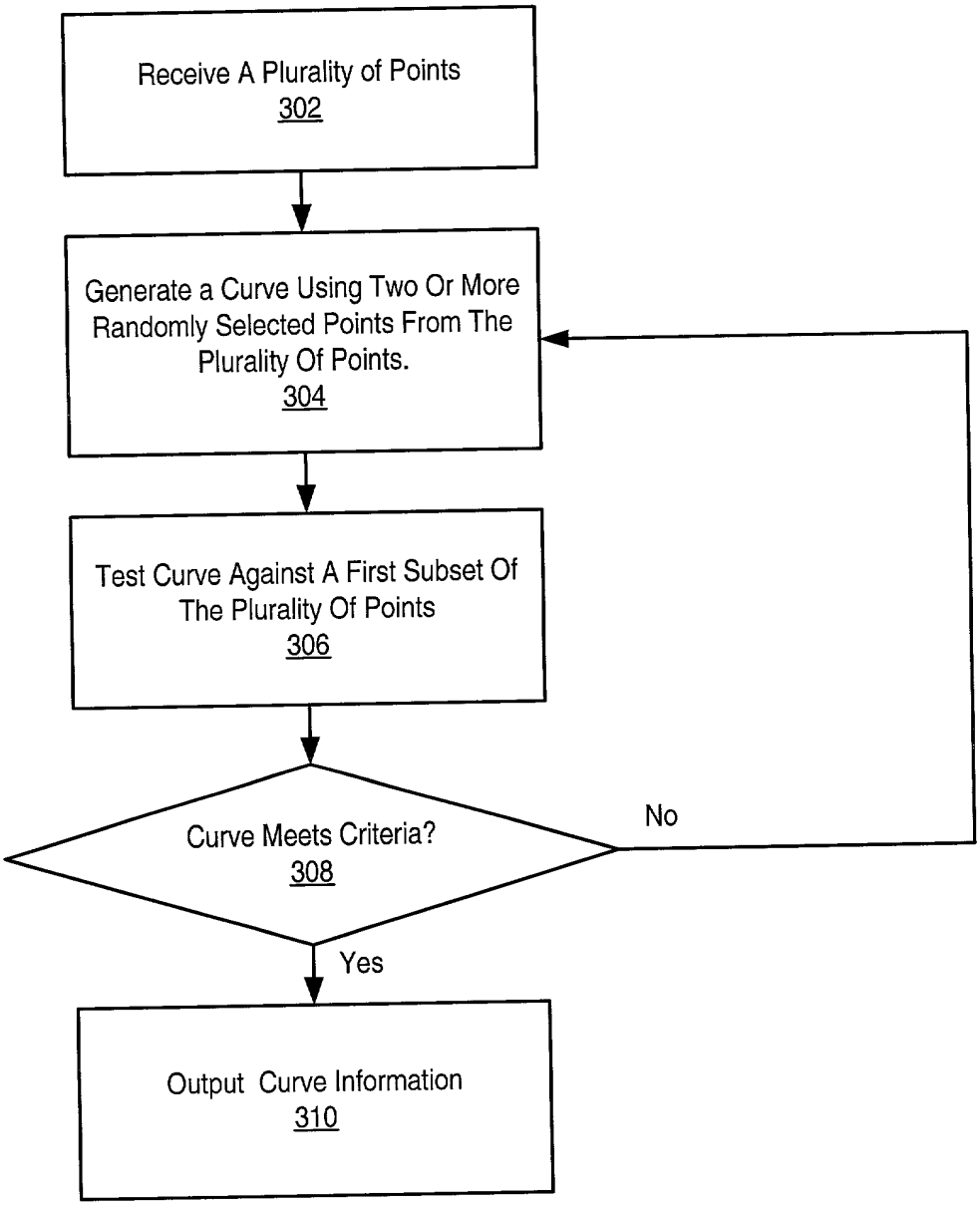

Receive A Plurality of Points
302
Generate a Curve Using Two Or More Randomly Selected Points From The Plurality Of Points.
304
Test Curve Against A First Subset Of The Plurality Of Points
306
Curve Meets Criteria?
308
No
Yes
Output Curve Information
310

Figure 3

Docket No. 200208.00

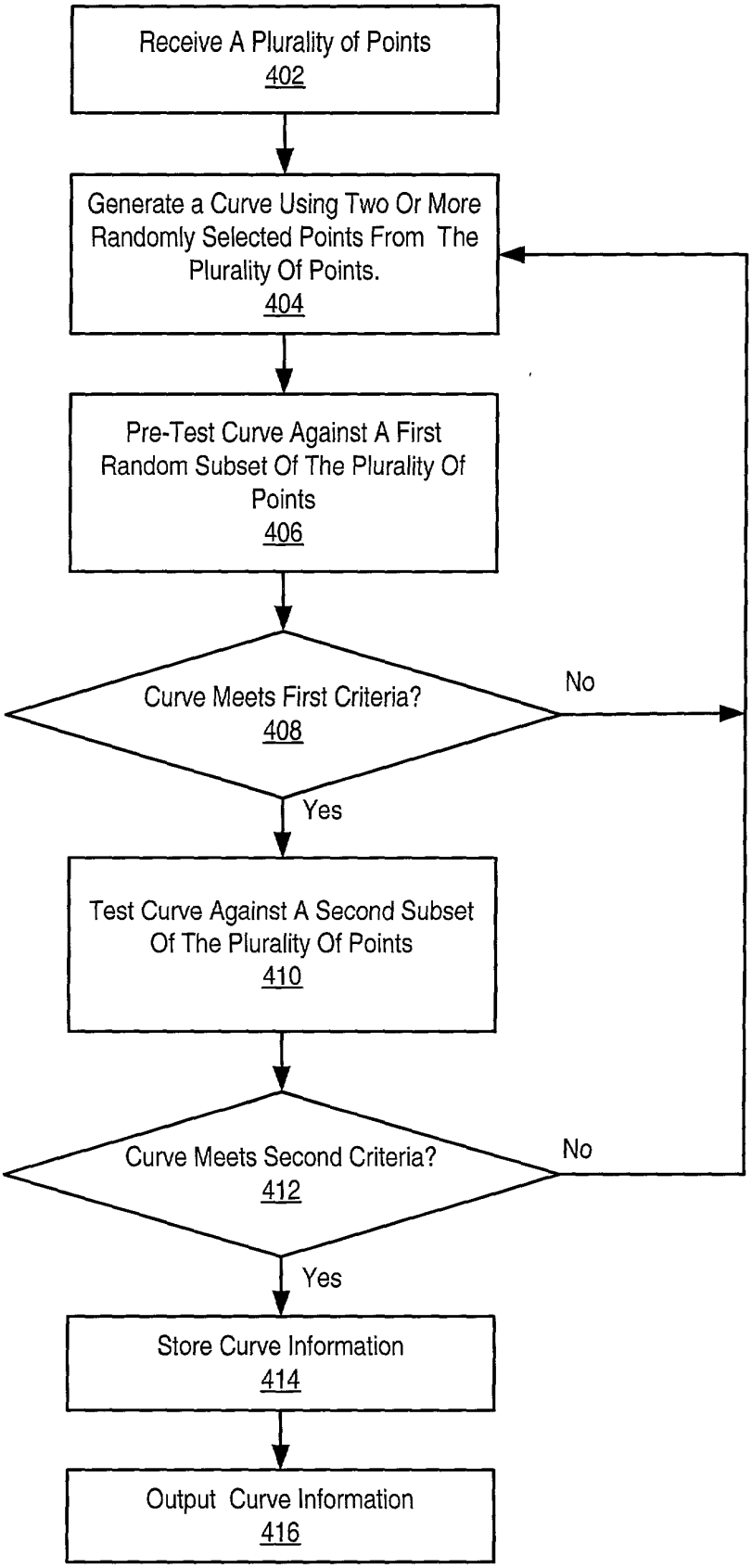


Figure 4

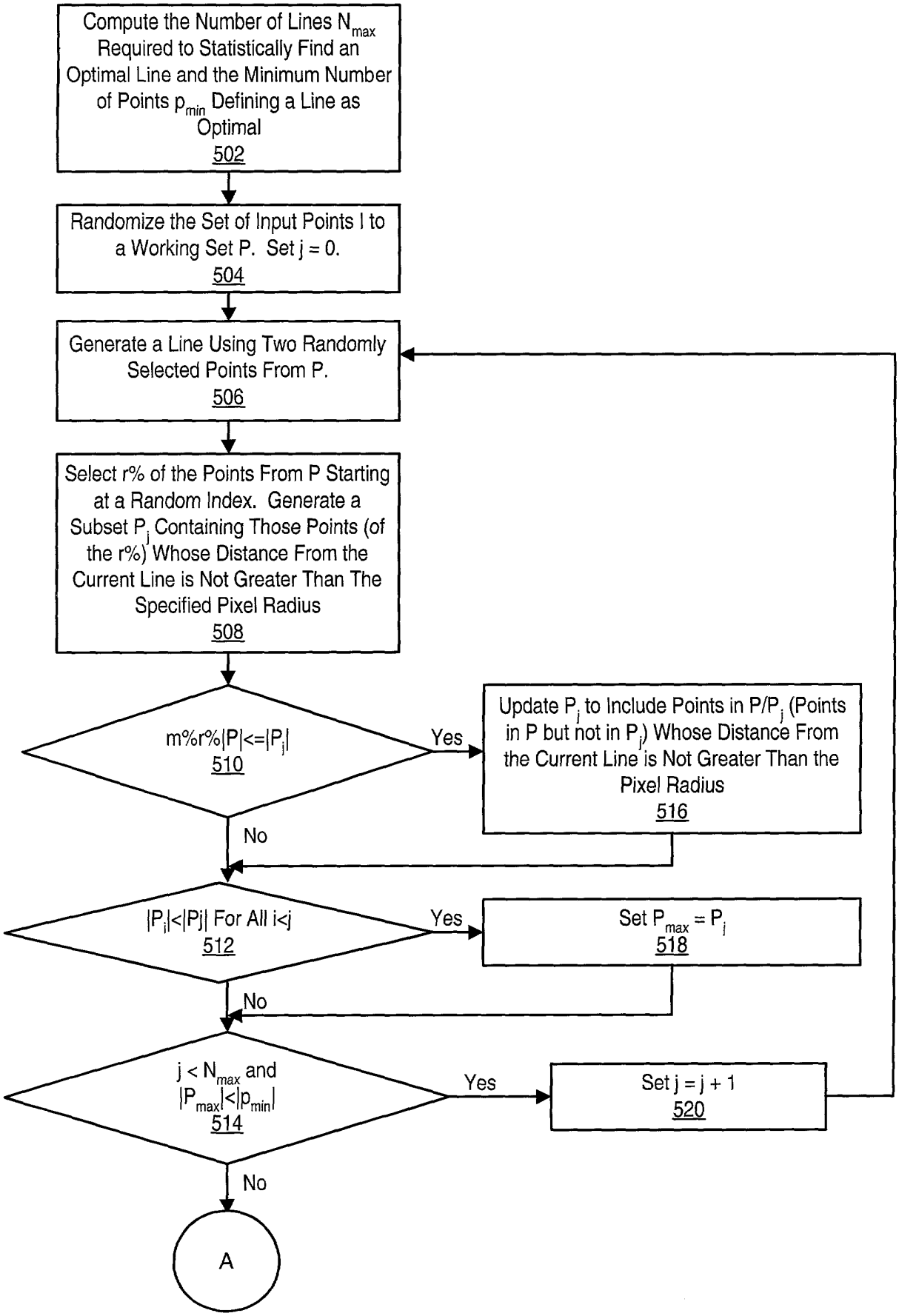

Compute the Number of Lines N_{max} Required to Statistically Find an Optimal Line and the Minimum Number of Points p_{min} Defining a Line as Optimal
502
Randomize the Set of Input Points I to a Working Set P. Set j = 0.
504
Generate a Line Using Two Randomly Selected Points From P.
506
Select r% of the Points From P Starting at a Random Index. Generate a Subset P_j Containing Those Points (of the r%) Whose Distance From the Current Line is Not Greater Than The Specified Pixel Radius
508
m%r%|P|<=|P_j|
510
Yes
Update P_j to Include Points in P/P_j (Points in P but not in P_j) Whose Distance From the Current Line is Not Greater Than the Pixel Radius
516
No
|P_i|<|Pj| For All i<j
512
Yes
Set P_{max} = P_j
518
No
j < N_{max} and |P_{max}|<|p_{min}|
514
Yes
Set j = j + 1
520
No
A

Figure 5A

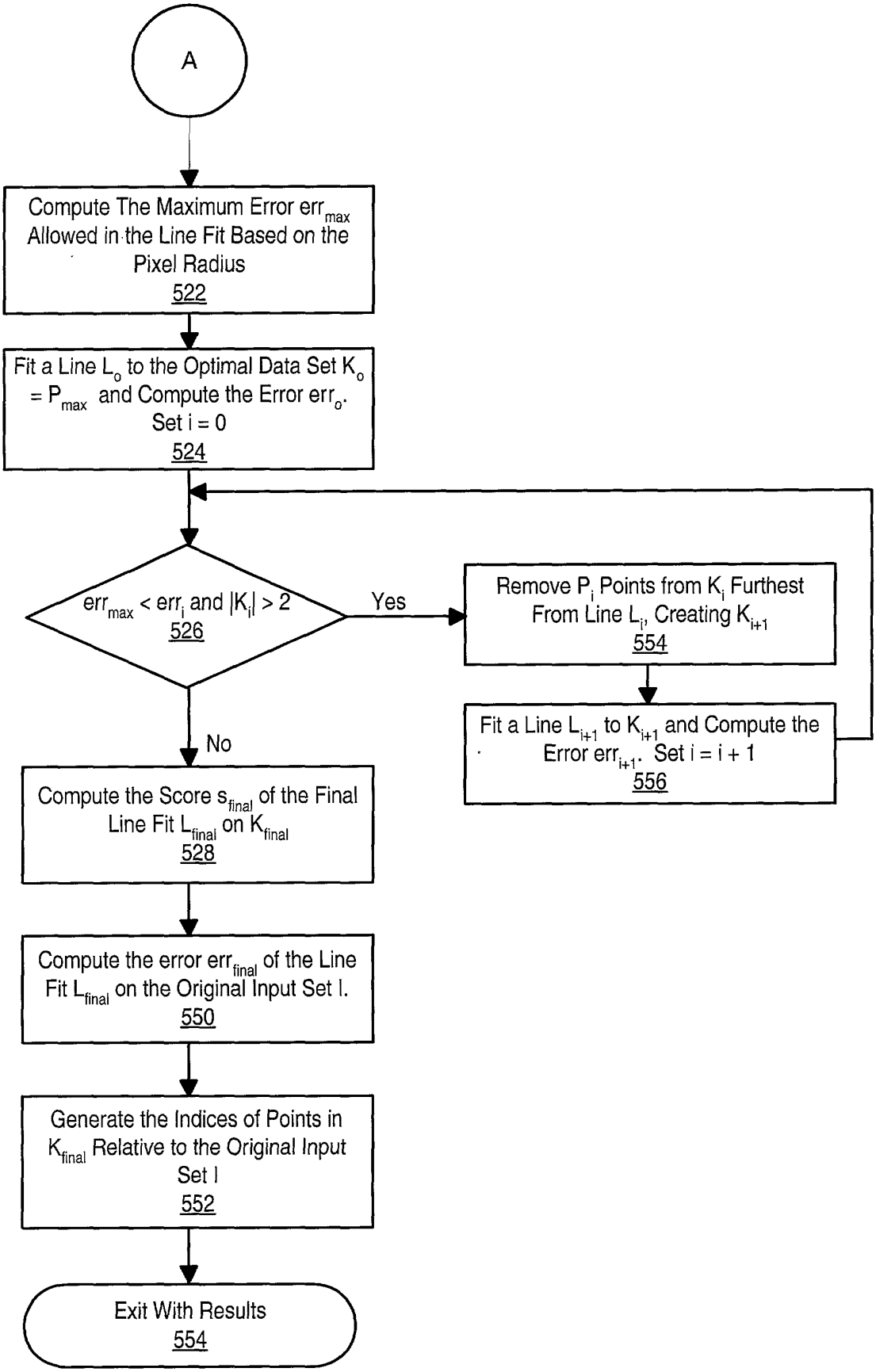

A
Compute The Maximum Error err_{max} Allowed in the Line Fit Based on the Pixel Radius
522
Fit a Line L_o to the Optimal Data Set $K_o = P_{max}$ and Compute the Error err_o. Set i = 0
524
$err_{max} < err_i$ and $|K_i| > 2$
526
Yes
Remove P_i Points from K_i Furthest From Line L_i, Creating K_{i+1}
554
Fit a Line L_{i+1} to K_{i+1} and Compute the Error err_{i+1}. Set i = i + 1
556
No
Compute the Score s_{final} of the Final Line Fit L_{final} on K_{final}
528
Compute the error err_{final} of the Line Fit L_{final} on the Original Input Set I.
550
Generate the Indices of Points in K_{final} Relative to the Original Input Set I
552
Exit With Results
554

Figure 5B

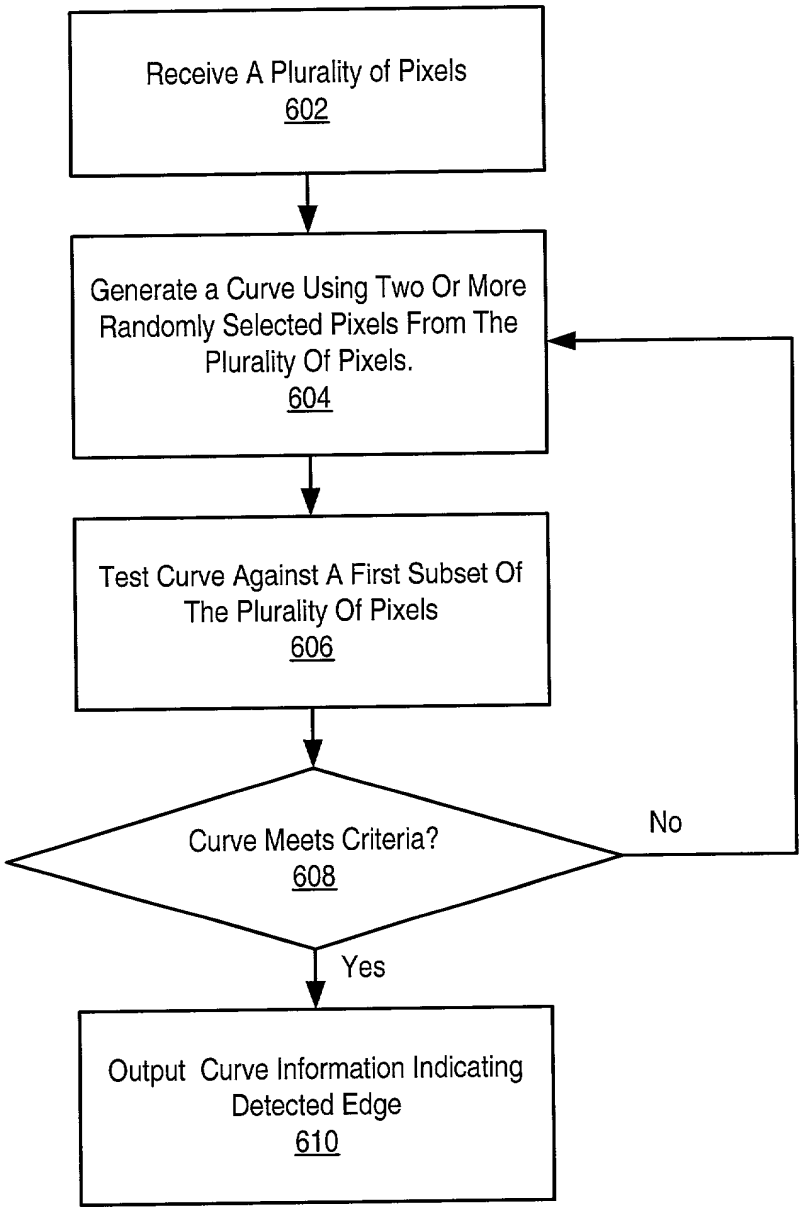

Receive A Plurality of Pixels
602
Generate a Curve Using Two Or More Randomly Selected Pixels From The Plurality Of Pixels.
604
Test Curve Against A First Subset Of The Plurality Of Pixels
606
Curve Meets Criteria?
608
No
Yes
Output Curve Information Indicating Detected Edge
610

Figure 6

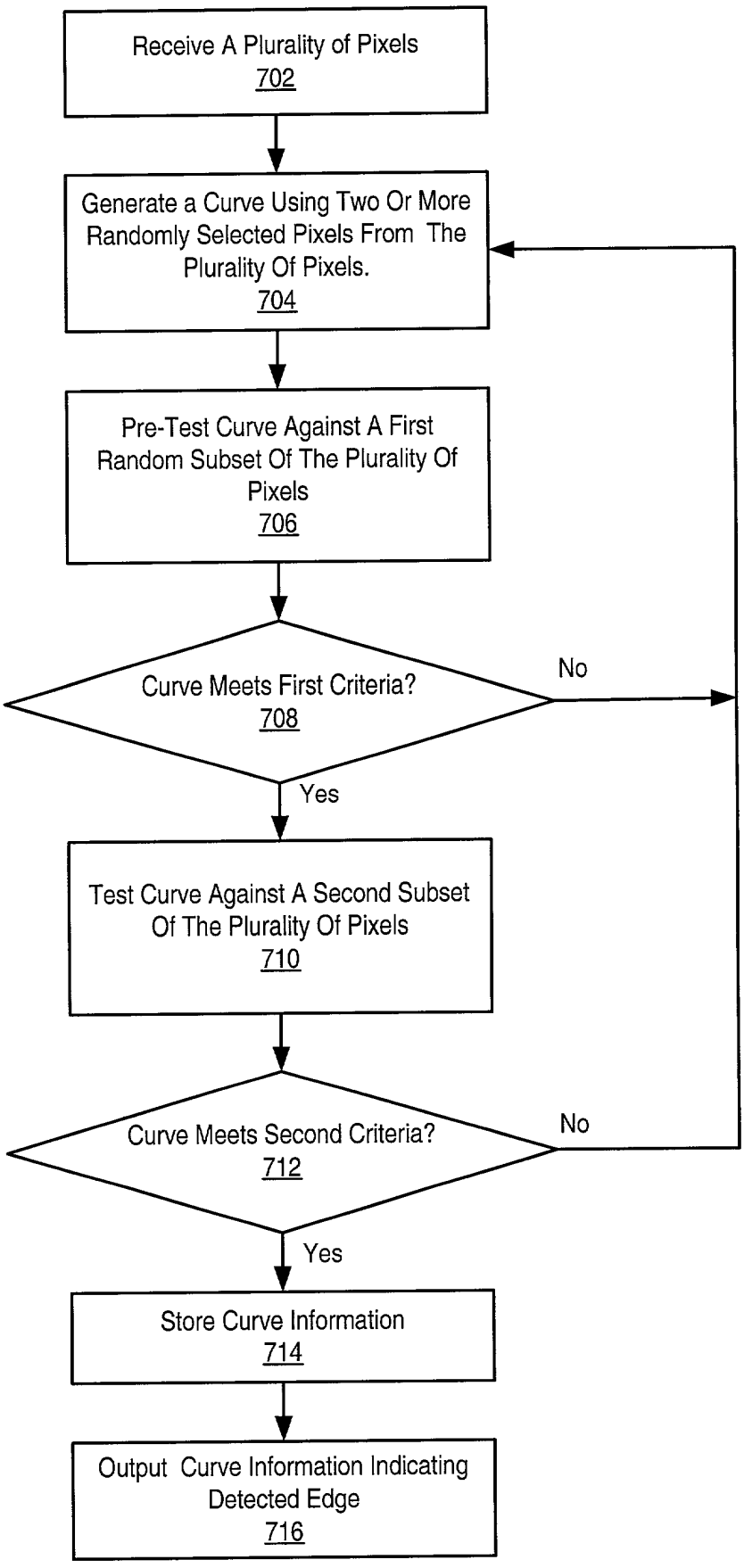

Receive A Plurality of Pixels
702
Generate a Curve Using Two Or More Randomly Selected Pixels From The Plurality Of Pixels.
704
Pre-Test Curve Against A First Random Subset Of The Plurality Of Pixels
706
Curve Meets First Criteria?
708
No
Yes
Test Curve Against A Second Subset Of The Plurality Of Pixels
710
Curve Meets Second Criteria?
712
No
Yes
Store Curve Information
714
Output Curve Information Indicating Detected Edge
716

Figure 7

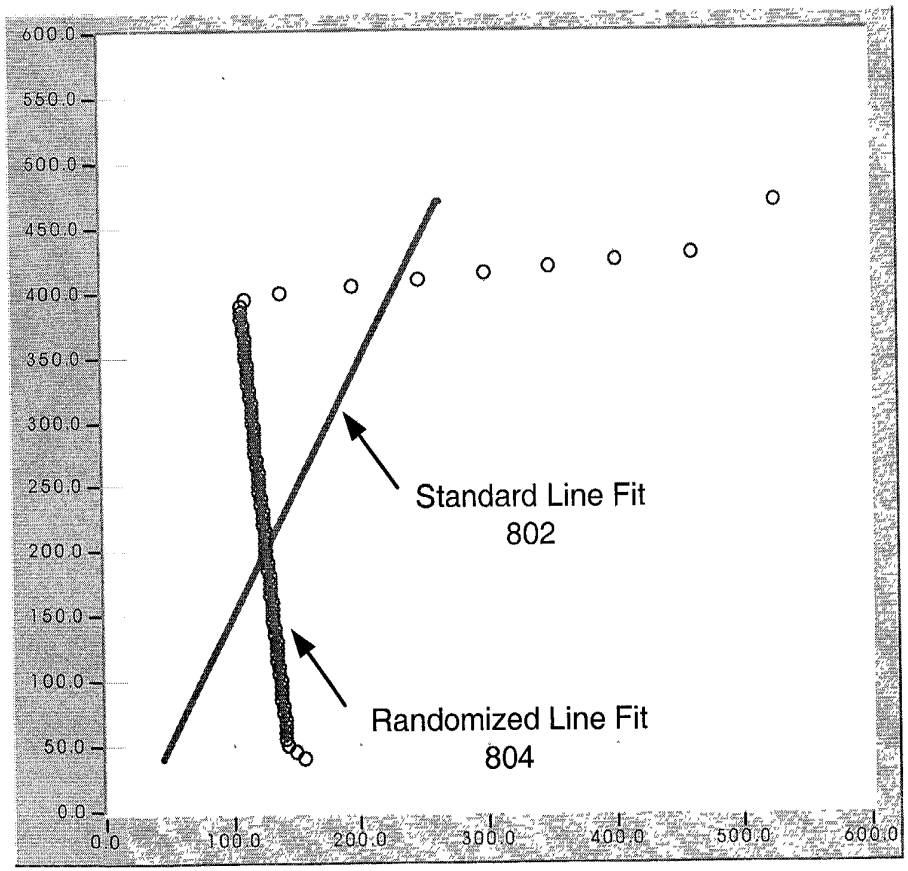


Figure 8

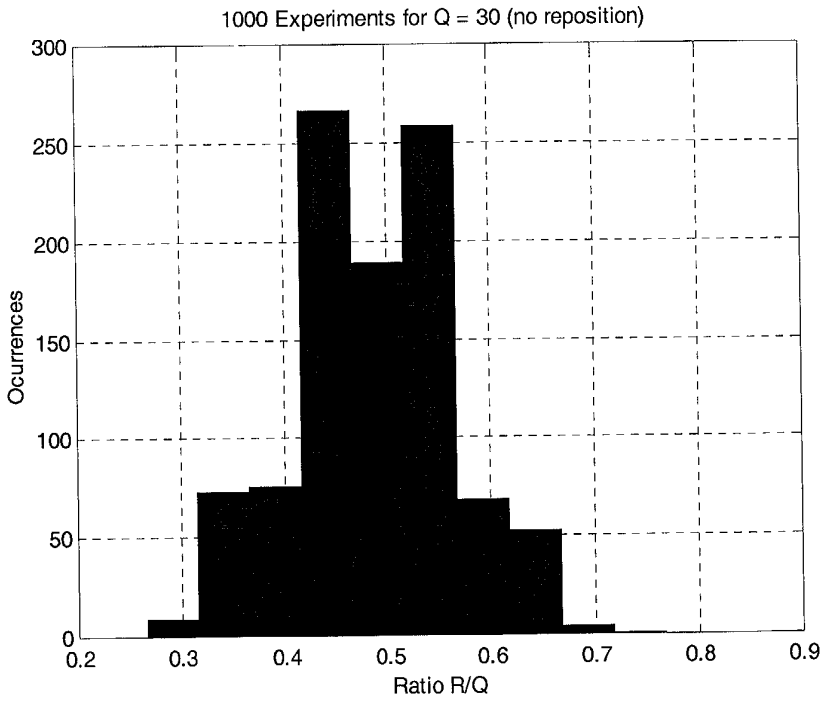


Figure 9

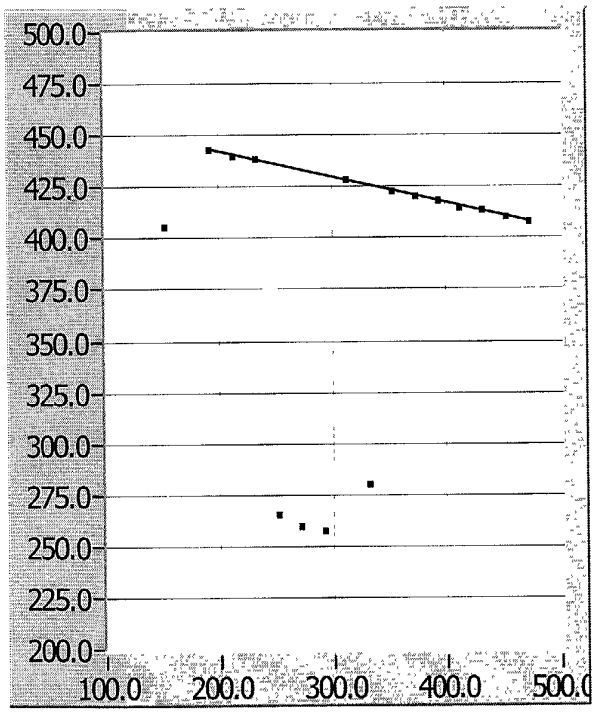


Figure 10A

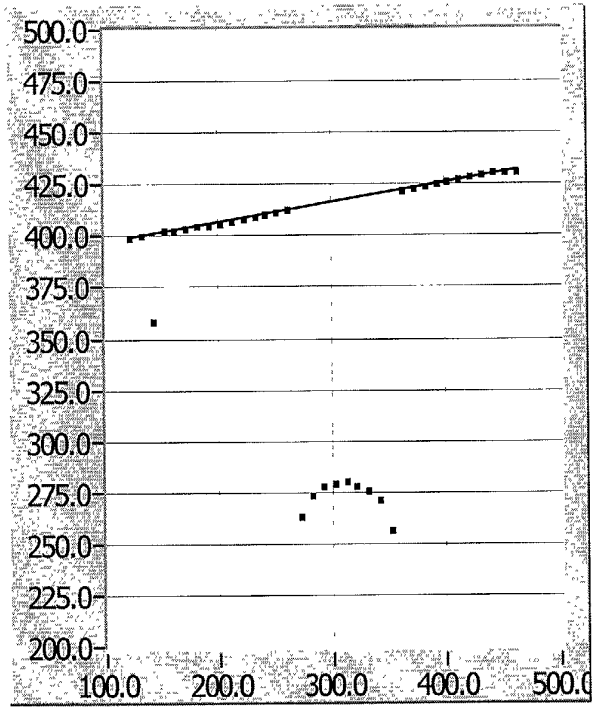


Figure 10B

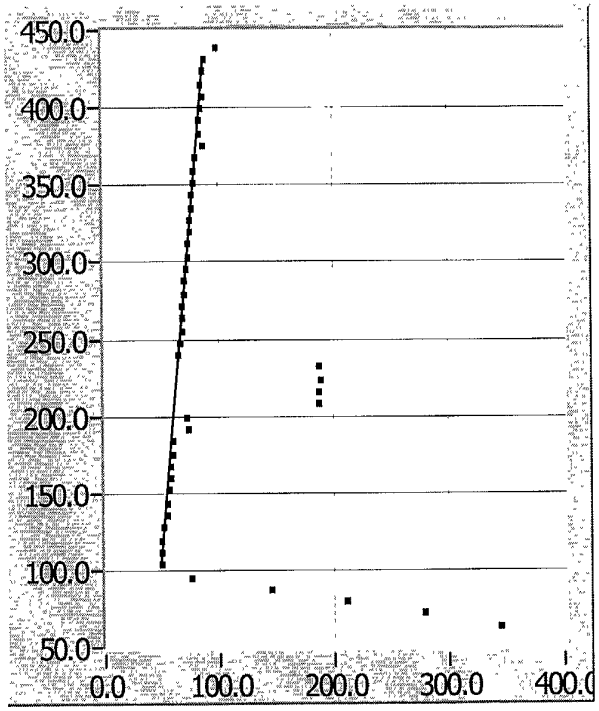
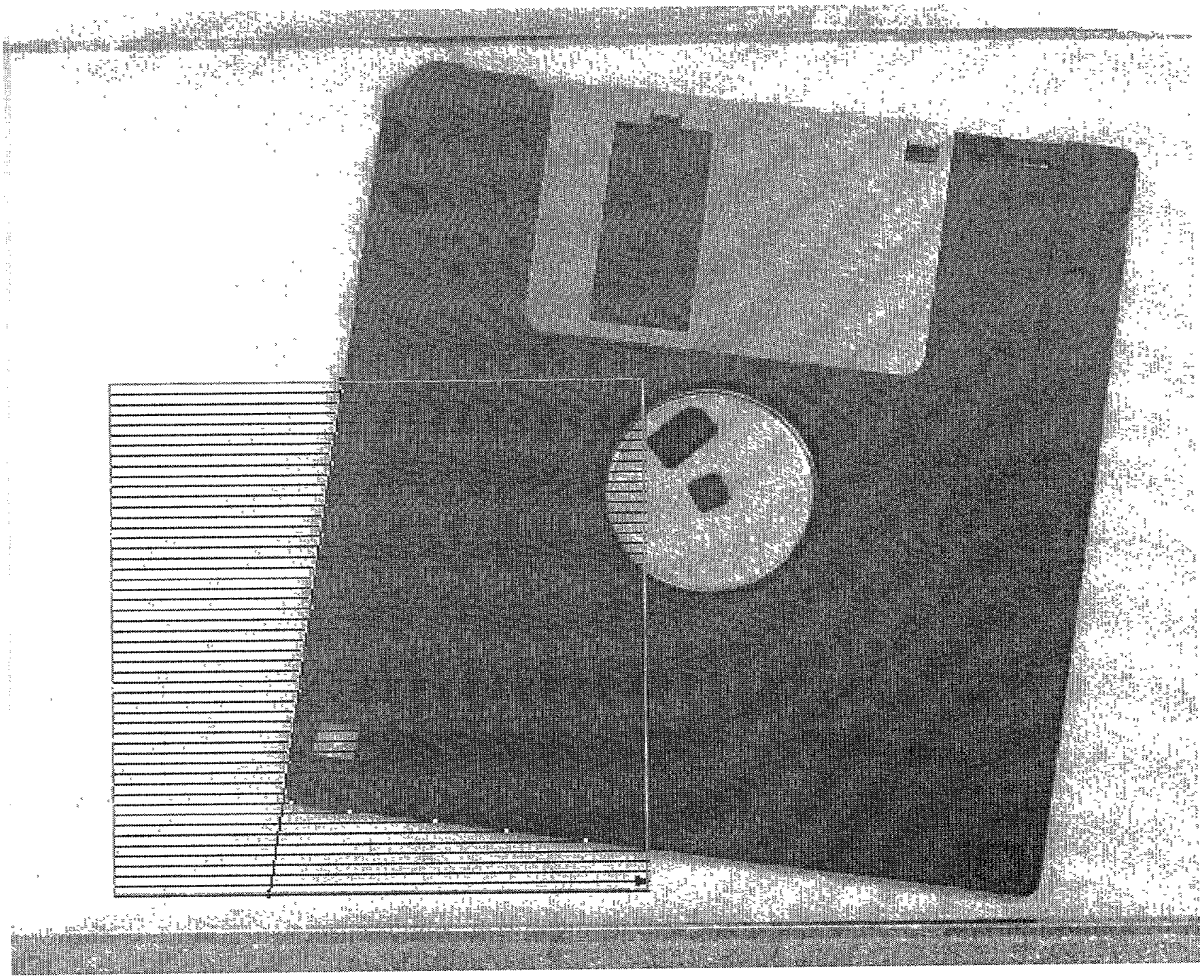


Figure 10C



Edge Detection in an Image

Figure 11